

two basal are respectively doubly mamillar and broadly triangular, and the remaining columellar tooth is smaller, rounded, and mamillar. The peristome is incrassate, reflexed, and broader towards the columellar region.

The specific name is the Greek ἀμφώδων, "encircled with teeth."

Cyclostoma ochraceum, sp. n. (Pl. XVI. figs. 8, 9.)

C. testa conico-depressa, anguste sed profundissime umbilicata, unicolore, brunneo-ochracea, parum solida; anfractibus 5, quasi tabulatis, duobus apicalibus lævibus, apice mamillato, cæteris spiraliter arcte filoliratis, liris acutis, regularibus, interstitiis sub lente obliquistriatis, ultimo rapide accrescente; apertura rotundata; peristomate continuo, simplici; operculum normale.

Long. 13.50, lat. 15 mm.

Hab. S. Africa.

Much larger than *C. transvaalense*, M. & P.; of different form, but of the same character so far as the spiral ridging is concerned. The shell is conically depressed; umbilicus narrow but very deep; apex mamillated, it and the first whorl are smooth, the others uniformly spirally ridged, the interstices being very finely obliquely striate. Colour a warm ochraceous brown, suggesting the specific name.

EXPLANATION OF PLATE XVI.

Fig. 1. Ennea impervia.

Fig. 2. Ennea Queketti.

Fig. 3. Subulina læocochlis.

Fig. 4. Subulina crystallina.

Fig. 5. Subulina glaucocyanea.

Figs. 6, 7. Pupa amphodon.

Figs. 8, 9. Cyclostoma ochraceum.

XLVIII.—Diagnoses of new Mammals from Madagascar.

By C. I. FORSYTH MAJOR.

LIMNOGALE, gen. nov.

(Fam. Centetidae.)

Head short, broad and flattened. Toes webbed. Tail powerful; very thick and almost square in the proximal half, the distal part laterally compressed. Skull broad and flattened. Cerebral region low; facial region comparatively high, but very short and broad. Zygomatic processes of

maxillary and squamosal present, but no zygomatic arches. No postorbital processes. Nasals *not* united. Tympanics ring-shaped. Infraorbital foramen large, bounded above by a very narrow, rod-like, bony arch. Frontals short and narrow, parietals broad and elongated. A minute interparietal. Foramen magnum very large. Clavicles present.

Dental formula.—I. $\frac{3}{3}$, C. $\frac{1}{1}$, P. $\frac{3}{3}$, M. $\frac{3}{3} \times 2 = 40$.

Premolars and molars presenting the general type of the Centetidæ family, and more especially of its smaller members with soft hairs. The inner pair of upper incisors caniniform and of considerable size, larger than the upper canines, their lower moieties divergent, so as to leave a triangular space between them, into which fit the two lower inner incisors, which are small and converging upwards towards each other. The second pair of lower incisors are likewise caniniform and larger than the canines. Second upper incisors almost of the size of the upper canines.

By the absence of zygomatic arches and postorbital processes, the ring-shaped tympanics, and by the form of the crowns of the molar teeth this new genus is shown to be a member of the Centetidæ; but it is as strikingly modified for aquatic life as *Potamogale* or *Myogale*.

1. *Limnogale mergulus*, sp. n.

General coloration of upper parts brownish, consisting of a mixture of fawn-coloured shorter hairs with less numerous and longer black ones, the posterior back blacker than the anterior. Upper surface of muzzle covered with short black-brown hairs. Whiskers of moderate size, not exceeding 30 millim. in length, nearly all pure white. Ears short, higher than broad; inner and outer sides of conchæ covered with short, dark grey hairs. Behind the ears a small patch of dark grey hairs. Lower parts of a light yellowish grey. The toes, both in manus and pes, united by a blackish membrane, wider in the pes and leaving the claws free. Outer margin of fifth toe of pes and corresponding metatarsal fringed with ciliate, thickly set, grey hairs; the same on manus, but longer and white-coloured. Likewise white, ciliate, but shorter hairs on the inner margins of pollex and hallux and the first metacarpal and metatarsal. Upper and lateral surface of tail scaly, thinly haired, dark brown; lower surface occupied by longer, thickly set, yellowish-white hairs.

Dimensions in the flesh of the Andraykiba specimen (♂):—

Head and body 128 millim.; tail 134; length of ear 9; fore foot (without claws) 16·5; hind foot (without claws) 30.

Skull of the type (♀): basal length 32; length of nasals in middle line 11·5; greatest breadth of skull across brain-case 16·5.

Type skin M. 1024 (♀). Caught March 18, 1896.

Hab. Imasindrary, N.E. Betsileo; another specimen (M. 805) was obtained in a marsh west of Andraykiba lake, two hours to the west of Sirabè (Vakinankaratra district, S.W. Imerina), at about 1600 metres above sea-level.

Local name *voalavorano* (*i. e.* water-rat).

2. *Microgale Thomasi*, sp. n.

Externally very like *M. Cowani*, but much larger. Colour of skin as in *M. Cowani* and *M. longicaudatus*, with a slightly lighter tinge. Ears large. Claws of manus longer and more curved than in *M. Dobsoni*, smaller than those of *O. gracilis*; curvature as in *M. Cowani*.

Type (M. 581) from Ampitambè forest (N.E. Betsileo), July 19, 1895; a second specimen (M. 202) from Ivohimanitra forest, in the country of the Tanala of Ambohimanga, Nov. 1894.

Measurements of type:—

Head and body 97 millim.; tail 64; manus 11; pes 19; length of ear $19\frac{1}{2}$; breadth of ear 14.

Length of skull 25·5; breadth across maxillary zygomatic processes 10·7; interorbital breadth 6.

Second specimen:—

Head and body 91; tail 62; manus 12; pes 19; length of ear 18.

3. *Microgale Talazaci*, sp. n.

Closely related to *M. Dobsoni* in general external appearance as well as in the conformation of the skull and teeth; but, besides being of much larger size, the colour of the skin is darker, being dark coppery brown, the centre of the back blacker.

Type and unique specimen (M. 1293), ♀, from the forest of the Independent Tanala of Ikongo, in the neighbourhood of Vinanitelo, one day's journey south of Fianarantsoa, May 22, 1896.

Measurements in millimetres:—

Head and body 124; tail 119; manus 14; pes 23; length of ear 16·5.

Length of skull 33·5; breadth across maxillary zygomatic processes 13; interorbital breadth 6·7.

Dedicated to the Rév. Père Talazac, S.J., of Tandrakazo (S. Betsileo).

4. *Microgale longirostris*, sp. n.

In coloration like *M. Thomasi*. Muzzle much produced and attenuated. Whilst in the last-named species, as well as in *M. longicaudatus* and *M. Cowani*, the contour of the skull is cylindrical, it is somewhat pyriform in shape in the present species, the cerebral cranium being comparatively broader, the facial cranium slenderer and more elongated, the latter character applying as well to the lower jaw, which is slenderer and more attenuated than in either *M. longicaudatus* or *M. Cowani*. The dentition is weaker than in *M. Cowani*, the secondary cusps more reduced than even in *M. longicaudatus*. Hind foot remarkably long.

Dimensions in millimetres :—

Length of head and body 69; length of tail 54; length of manus 9; length of pes 18·5; length of ear 14·5.

Type and only specimen, ♀ (M. 490), a dry skin, with the skeleton complete, from the neighbourhood of Ampitambè, 4th July, 1895.

Local names *forimenjy*, *rainijora*.

5. *Oryzoryctes gracilis*, sp. n.

Coloration of the skin as in *O. tetradactylus*, *M. Cowani*, &c. The claws of the pentadactyle manus smaller and less curved than in *O. tetradactylus*. Though the skull is longer than in *M. Thomasi*, its frame is much more slender, and by the elongation of the facial cranium and lower jaw, as well as by the delicate teeth, it very much recalls the skull of *Hemicentetes* in miniature. The anterior upper and lower premolar separated by a wider interspace from both the canine and the second premolar than in any other known member of the family, *Hemicentetes* and *Centetes* excepted. This remark applies as well to the two outer upper and the last lower incisor, with regard to the teeth immediately preceding and following them. The outer margins of the upper molars are more deeply notched than in all other known Centetidæ.

Dimensions in millimetres of type specimen in spirit (M. 184) :—

Length of head and body circa 93; length of tail 81; length of manus 11·5; length of pes 18; length of ear 16.

Type from Ambohimitombo forest, Nov. 1894; a second specimen (skeleton) from Ankeramadinika forest, obtained by Dr. Moss.

N.B.—By the non-fossorial character of the claws this

animal approaches the known species of *Microgale* (*M. crassipes*, M.-Edw., excepted) more than those of *Oryzoryctes*; but by the characters of the skull and teeth it is different from either, and would have better claims to be placed in a distinct genus than the different forms of *Microgale*. To avoid this the name of *Oryzoryctes*, being the older one, is provisionally adopted here.

6. *Oryzoryctes niger*, sp. n.

Very much like *O. tetradactylus* in general appearance, but entirely black above, with a more greyish tinge beneath. Fur as in the former, somewhat less soft than in *O. hova*. Head a little broader behind and muzzle less produced than in *O. tetradactylus*. Fore foot tetradactyle; claws as in *O. tetradactylus*, slightly shorter than in *O. hova*. The skull is somewhat intermediate in shape between those of *O. tetradactylus* and *O. hova*, though approaching closer to that of the former, from which it is, however, at once to be distinguished by the slightly broader cerebral cranium.

Dimensions in millimetres of type specimen, ♀ (M. 357):—

Length of head and body 106; length of tail 49; length of manus 10·5; length of pes 16·5; length of ear 12·5.

Marshes near Sirabè (type specimen), native name *voalavorano*; Ampitambè.

BRACHYUROMYS, gen. nov. (Fam. Muridæ.)

Skull broad and massive. Upper profile of cerebral cranium flattened. Supraorbital crests rounded off. Incisors and rooted molars ($\frac{3-3}{3-3}$) large as compared to the size of the skull. Crowns of molars flattened, not tuberculate. In young specimens the crowns of the molars show three lobes of enamel, united by cement and obliquely disposed (inclining forwards with their outer portion), the posterior lobe in the upper, the anterior one in the lower molars being the smallest. These lobes soon unite together, forming various patterns, by which the different species may be easily distinguished. Tail shorter than usual in Muridæ. By their broad, moderately flattened, roundish heads and comparatively short tails these Rodents recall somewhat the Voles in outer appearance.

Type *B. ramirohitra*. Bartlett's "*Nesomys betsileoensis*"* also belongs to this genus.

* P. Z. S. 1879, p. 770.

7. *Brachyuromys ramirohitra*, sp. n.

Ears large, oval. Coloration of upper parts brown, abundantly mixed with black, on the sides less dark, the black hairs gradually diminishing. Lower parts fawn. Basis of hairs slate-coloured. Tail furnished above with black, beneath with grey hairs. Parietal crests diverging anteriorly. Interparietal short in transverse, but longer in antero-posterior diameter than in *B. betsileoensis*. Molars very large, all about of equal size, the third in both jaws generally slightly smaller than the other two; the third upper one slightly triangular. The pattern presented by the uniting of the three enamel-lobes is as follows in moderately worn teeth:— In the two upper anterior molars: (1) an anterior enamel-loop, open on the inner side and running obliquely across the crown, close up to the outer enamel-margin of the tooth; (2) a posterior enamel islet, smaller in transverse extent than the anterior loop and almost parallel to it. In the last upper molar the anterior loop is shut out very soon from the inner side, so that this tooth presents two obliquely transverse enamel islets, with sometimes a third smaller one, behind. In moderately worn lower molars the shorter anterior loop opens on the inner, the longer posterior loop on the outer side, the latter remaining open for a longer time than the former.

Dimensions in millimetres:—

	Skin (M. 429), ♂, type.	Skin (M. 509), ♂.	M. 181, jun. (in spirit). c. 110
Length of head and body..	165	162	73
„ tail	99	89	16
„ manus	15	16	27
„ pes	34	52	17
„ ear	24	24	

Dimensions in millimetres of skull (M. 789, ♂):—

Basal length 32·5; length of nasals in middle line 13·5; length of frontals in m. l. 13·5; length of parietals in m. l. 6·3; interorbital breadth at narrowest 4·7; length of upper molar series 8·5; length of lower molar series 8·5; length of interparietal in middle line 5·2; breadth of skull between zygomatic arches 23·5.

Loc. Ampitambè forest, Betsimisaraka country (on the border of N.E. Betsileo), 6 hours S.E. of Fandriana.

Native names *voalavoanala*, *ramirohitra*.

Fossil in the lower deposits of the Children's Cave (Sirabè).

Gymnuromys, gen. nov.
(Fam. Muridæ.)

Molars $\frac{3}{2}$, with flat, not tuberculate crowns, their patterns presenting a superficial resemblance to *Myoxus nitela*. Molars exceedingly small as compared to the size of the skull and the whole animal, forming two parallel rows in the upper jaw; last molar largest in both jaws.

8. *Gymnuromys Roberti*, sp. n.

Upper parts black-grey, almost slate-coloured; laterally with the admixture of a few white hairs; beneath white or yellowish white. Tail scaly, almost naked, the small stiff hairs being more scanty than even in *Mus rattus*. Ears large, acute oval. Snout produced. Whiskers very long (55-58 millim.). Skull low, narrow, and elongated; no supraorbital crests; parietal crests lyriiform in shape. The crowns of the molars present from 4 to 6 transverse narrow loops; in the upper molars one of these remains open on the inner margin till the teeth are much worn, whilst they are all shut out from the outer margin at a much earlier stage. In the lower molars these loops are somewhat more complicated, sometimes two joining together and thus forming irregularly ramified patterns; they remain for a longer time open on both sides than in the upper molars. Much worn molars present nothing but central islets, arranged somewhat irregularly, but preserving on the whole the transverse direction.

Pregnant females obtained on June 24th and July 17th; two fetuses in each case.

Dimensions in millimetres:—

	M. 446, ♀ (type).	M. 510, ♂.
Length of head and body ..	160	150
„ tail	165	167
„ manus	15	15.5
„ pes	34	35
„ ear	20	21

Dimensions of skull (M. 729, ♂):—

Basal length 35; length of nasals in middle line 16.3; length of frontals in m. l. 13.5; length of parietals in m. l. 6.5; interorbital breadth at narrowest 5; length of upper molar series 5.8; length of lower molar series 6.5; length of interparietal in middle line 4.5.

Ampitambè forest.

Native name *voalavoanala*.

9. *Chirogale Sibreei*, sp. n.

On the whole resembling *Chirogale Milii*, Et. Geoffr., but smaller, and presenting differences in the skull. Coloration of fur silvery grey, with here and there a slight addition of fawn. Beneath whitish.

Dental formula.—I. $\frac{2}{2}$, C. $\frac{1}{1}$, P. $\frac{3}{3}$, M. $\frac{3}{3}$.

Skull smaller, but in some of its transverse dimensions comparatively broader than in *C. Milii**. Parietals more globose than in the latter. The maxillaries are hollowed out in front of the lacrymals, a character not observed in *C. Milii*. In the form of interparietal more approaching *Opolemur*† than *C. Milii*.

Three adult specimens were obtained from the neighbourhood of Ankeramadinika (one day's journey to the east of Antananarivo); one of these, which had been kept alive for the purpose of taking measurements in the flesh, was lost.

Dimensions in millimetres of skull and teeth of type, ♂ (M. 839):—

Basal length	42.5 (<i>C. Milii</i> 49 & 50) †
Length of nasals in middle line	19
" frontals " "	14
" parietals " "	13.5
" interparietal " "	6.5
Breadth across zygomatic processes ..	31
Breadth between procc. postauditor. of squamosum	24.5
Breadth across parietals	23.5
Breadth behind postorbital processes of frontals	14.6
Interorbital breadth at narrowest	8
Breadth between post. basis of upper canines	10.5
Length of upper dental series (m_3 —ant. basis of canine).....	18.2
" upper molars	8.5
" upper premolars	6.5
" lower dental series (m_3 —ant. basis of canine).....	16
" lower molars	9.5
" lower premolars	4

* See dimensions of *C. Milii* in Forsyth Major, "Ueber die malagassischen Lemuriden-Gattungen *Microcebus*, *Opolemur*, und *Chirogale*," *Novitates Zoologicae*, vol. i., Jan. 1894, pp. 28–31.

† *L. c.* pp. 20, 21.

† *L. c.* p. 29.